DENALI NATIONAL PARK AND PRESERVE

CENTRAL ALASKA NETWORK

Vegetation Monitoring Program

Summary Trip Report: Hult Creek Mini-grid

13 July – 22 July, 2009

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PURPOSE:

The purpose of this trip was to establish and measure 25 permanent vegetation monitoring plots in the Hult Creek mini-grid according to the Central Alaska Network (CAKN) vegetation monitoring protocols (see Roland *et al*. 2005). We successfully sampled 19 points; the remaining six not sampled due to difficulty of access and insufficient time.

PERSONNEL:

Peter Nelson – crew leader, navigation, non-vascular plant composition/collection, soils
Carmen Backes – plot photos, tree and sapling measurements, tree cores, transect data
Jamie Martin – vascular plant composition/collection, plot/quadrat variable estimates, transect data

ACCESS TO MINI-GRID AND CAMPING POSSIBILITIES:

The Hult Creek mini-grid is located west/southwest of Kantishna along the Foraker River. To get there, it is necessary to fly by helicopter from Kantishna. For our trip, two crew members flew by helicopter from headquarters. Then another crew member with the majority of the crew's equipment and gear flew on a charter flight with Kantishna Air Taxi in a Cessna 206 fixed wing aircraft from the landing strip near headquarters to Kantishna. The helicopter returned to Kantishna after dropping off the first two crew members to shuttle the remaining crew member and gear to the camp location.

In planning the trip to the Hult Creek mini-grid two possible camp locations were considered: one central to the mini-grid near Hult Creek, or one on the western edge of the mini-grid along the Foraker River. The location along Hult Creek offers easy access to fresh water, and a central location from which to hike to the plots. The location along the Foraker offers an easier landing site for the helicopter and a more open space to watch out for wildlife. In the end, we followed the recommendation of the bird crew, who visited the Hult Creek mini-grid previously. They had camped along Hult Creek and advised against it. One major complaint was the thick swarms of mosquitoes, which theoretically are fewer along the gravel bar. Also, the brush is very thick in most of the Hult Creek mini-grid, meaning that after a day of thrashing through alder and willow, a team can continue to do the same as they attempt to move between their tents and cooking area.

For these reasons, we camped along the Foraker River, rather close to point 10. The helicopter had no issues coming and going, and there were nice level sandy spots for pitching our tents. It was probably easier to charge the solar panels in the light open space of the gravel bar than it would have been in the darker forest. We did not have trouble with wildlife during our stay, but it should be noted that we discovered a very well-used game trail in the forest near to our camp. Mosquitoes, however, were pretty bad everywhere, even on the gravel bar. This is mostly because during our stay there was very little wind. On the first evening after our arrival, and the afternoon of the last day before we left, there was the slightest of breezes close to the water, this did reduce the number of bugs somewhat, to great relief of the whole team.

Photo 1. Camp on the Foraker River gravel bar. The site offered a break from the thick brushy forest of the Hult Creek mini-grid. Photo by Carmen Backes.

Fresh water was a bit of an issue. We brought 15 gallons of fresh water with us, which we used strictly for drinking, and then tried to use the very silty water of the Foraker for washing and cooking. After the first night of eating pesto that was crunchy with river silt, we tried other options for supplementing our fresh water needs. We carried a water filter and dromedary bag with us on our sampling expeditions because we always seemed to be crossing small freshwater streams (Hult Creek or its many small tributaries). Also, by hiking around on the gravel bar we were able to locate a few channels where ground water was seeping into the river or river water was flowing so slowly that it lost most of its sediment load. This water could be used without clogging the filter.

HIKING:

The good news for crews sampling the Hult Creek mini-grid is that there is not much topographic relief to be negotiated. All the same, that does not mean the hiking is easy. All members of our team were surprised at just how long it took us to go short distances. This was mostly due to thick brush, but other complicating factors were large amounts of down dead logs that had to be climbed over, streams that needed to be crossed, beaver ponds that needed to be hiked around, and soft, spongy ground that took greater effort to walk through. The team wore their bug shirts and Xtra Tuff boots continuously for this mini-grid. Hot weather did not go well with hiking in bug-proof clothing: with heads and faces covered, it is hard for skin to breathe. This made the crew members sweat more than they might have hiking in similar temperatures in more comfortable surroundings and underscores the need for drinking lots of water.

In general, the slowest hiking was in the south-central part of the mini-grid. This is where the brush was the thickest, and there the most wind-thrown rotting logs were found. Along Hult Creek, it was generally brushy, with lots of small streams or boggy spots that slowed progress. The Eastern row of plots were slightly higher in elevation that the rest of the mini-grid, and thus, it was usually easier to move north-south along this line than east-west, even with the slight ups and downs in topography. From camp, the easiest walking was taking an old river channel to the north and east, and then heading towards points 9 or 14.

Here are a few observations that could be useful to future crews:

- Walking from point 3 to camp (near 10) took us 45 min of hard non-stop hiking. In contrast, walking 14 to 19 is relatively easy. Keep this in mind, especially when considering the approach to plots in the middle of the grid.
- We were able to wade across Hult Creek near point 12.
- There is a boggy area in the low spot between 11 and 6, we made it through with Xtra Tuffs, but it might require a different route in a wet year.
- Plot 17 was located half in Hult Creek. Getting there required crossing many small channels on rotten logs.
- Plot 22 was declared inaccessible because the actual plot location was under a foot or so of water. Around Plot 22 is an extensive network of beaver dams, with pools of water at every turn. On our way back to camp afterwards, we had to go south from 22 a fair distance to get out of the ponds before turning in the direction of camp. It would thus be almost impossible to hike from 21 to 23 directly.
- We encountered a swamp south and a little west of point 16 that was a challenge, and may be prohibitive in a rainy summer, it was no problem going north from 16.

For our trip, we brought along a pack raft, mainly for trying to cross the Foraker River. However, after two days of heavy rain at the beginning of our trip, we were unable to cross Hult Creek because it was too deep. We waited a few days for the weather to change before attempting it again. On the second trip, we brought along the pack raft. The weight of the raft was not too much of a burden to carry, but it was pretty annoying to navigate with the cumbersome paddles through the heavy brush. However, by the time we reached Hult Creek the second time, the water level had dropped, and we were able to wade across without the pack raft. Future crews might want to consider bringing a raft along, even if they do not plan to cross the Foraker. In the event of rain, it might be necessary to raft across Hult Creek.

WEATHER AND ENVIRONMENTAL CONDITIONS:

Weather during our visit to the Hult Creek mini-grid was characterized by warm to hot days with intermittent smoke from wildfires and almost no breeze. An exception to this was July 15 and 16, which were rainy and cooler. The weather affected water level in the rivers and streams. The Foraker was definitely higher in the evenings, and would creep into many of the side channels around our camping area that would then dry up by morning. Hult Creek and the surrounding streams and ponds were noticeably higher in the days after the rain event, which meant the difference between being able to cross by wading or needing a raft.

It is also worth mentioning that this month was one of the hottest and driest Julys on record for interior Alaska. Perhaps the spring fed streams would be even fuller during a more rainy summer. It is also possible that the water level in the Foraker was higher because of all the warm weather during our trip. Bogs and ponds could also be wetter, deeper or more expansive during a wet year than what we experienced.

Sampling Date	Approximate Daytime High Temperature (°F)	Description
July 13	82	Sunny, hot, calm
July 14	88	Smoky, hot, calm
July 15	58	Rain to heavy rain and calm
July 16	55	Rainy and calm
July 17	78	Sunny and warm
July 18	91	Sunny and hot
July 19	70	Mostly cloudy and calm
July 20	87	Partly cloudy and calm
July 21	79	Mostly sunny and calm, clouds in PM

SAFETY CONSIDERATIONS:

Most safety issues in the Hult Creek mini-grid are averted with common sense. We did not have any major wildlife encounters on this trip, but the range of visibility was always restricted by trees and brush, and thus there is always some potential for stumbling into a dangerous situation if you do not remain alert and aware. There are lots of water crossings in the Hult Creek mini-grid, varying in size. We had good luck finding fallen logs to help with most of the crossings, but the majority of these logs were wet and very rotten. Use caution in selecting a crossing route. Utilizing the soil probe or transect staff to balance may add security. There are very many standing rotten trees in the mini-grid. Very often, in the effort to push or pull their way through alder, crew members would reach out to grab a tree only to have it topple. So, be careful! At times, from camp we would hear the sound of trees occasionally falling over. It seems that this area has very little wind, and if windy conditions should arise, there could be a considerable danger from falling trees.

A few times while moving through the mini-grid, the team encountered ground-nesting wasps or hornets. Jamie was painfully stung multiple times when the crew arrived at Plot 3 and she happened to drop her pack on top of a nest. Fortunately, she was not allergic, but technicians who are allergic should come to Hult Creek prepared for the possibility of being stung.

In an effort to reach plots 20 and 25, we attempted to use an Alpacka raft to cross the Foraker River. In spite of our repeated attempts, the river channels proved to be too wide and swift. If future crews attempt to sample these points (which we declared inaccessible) a larger, sturdier raft and longer rope may be necessary, as well as a personal floatation device.

PHENOLOGY OBSERVATIONS:

We visited the Hult Creek mini-grid in the height of summer, full of flowers and ripening fruit. Most conspicuously, *Rubus chamaemorus* was fully ripe, and those berries not eaten would fall off the plant as we trudged by. Other berries in fruit were: *Vaccinium uliginosum, Vaccinium vitis-idaea, Empetrum nigrum, Arctostaphylos rubra,* and *Geocaulon lividum.* Many species were in flower during our inventory, such as: *Moehringia lateriflora, Moneses uniflora, Linnaea borealis, Orthilia secunda,* and *Epilobium angustifolium.*

Plots varied in their diversity of vascular plant species, with the higher diversity found in wet forested meadows, and the lowest diversity in the open black spruce. Plots averaged 21 species per plot, with a few approaching 40 species.

SWITCHED PLOTS

Of extreme importance to future crews visiting the Hult Creek mini-grid is the clarification of a mix up between two plots. On the first day of sampling (July 13), the crew sampled plot 24. However, Jamie mistakenly entered all the field data into the tablet PC for point number 23. Then, on the last day of fieldwork (July 21) the crew sampled plot 23, and, not having a place to enter data in the tablet, entered all the values for plot 23 into the place for 24 in the database, assuming there would be a quick and easy fix for this once we returned to civilization. Unfortunately, there was no easy fix, and so it was decided to leave the two points mixed up in the database with lots of notes explaining the situation. However, because this was a data-entry mistake, the monument heads in place in the field reflect what the location should be. So, to be perfectly clear:

- Plot 23, visited July 21, with monument number 23, is entered as plot 24 in the database
- Plot 24, visited July 13, with monument number 24, is entered as plot 23 in the database

After return to the field, GPS locations for these points were modified to reflect this change. For a visual, refer to Map 1.

GENERAL NOTES ON PLOT-WORK AND PLOT OBSERVATIONS:

For the first days of work in the Hult Creek Mini-grid, the team was only able to complete two plots a day. Several factors contributed to the slow down, including difficult hiking, equipment malfunction, a crew unaccustomed to working together, and large numbers of trees and saplings in the plots. The average trees per plot was 12, but several plots had more than twenty trees. The average saplings per plot was 61, but there were many plots exceeding 100 saplings. We could have cored more trees, but at more than half of sampled plots, we only cored one or two trees because of time constraints and a high number of rotten cores.

During the rainy days, we had quite a few problems with our equipment. In spite of our efforts to dry things in our tents at night, at different points Haglöf stopped working, the camera lens fogged up, the hand lenses fogged up, the ocular piece for the transects fogged

up, and the stylus with the Tablet PC stopped working. This caused interruptions in the flow of work, but were remedied by drier weather conditions.

Table 1. Collection series for the Hult Creek mini-grid.

Collector	Identifier	Series
Nelson	Soils	21 samples collected
Martin	Vascular plants	JM-09-034 to JM-09-128
Nelson	Nonvascular plants	PRN-09-167 to PRN-09276
Backes	Photos	100-0454 to 100-0721
Backes	Tree cores	46 cores collected

ACTIVITES:

Date	**Activity**	**Comments**
July 13	Travel, set up camp	
	Plot 24	On way to plot confirmed 15, 20 and 25 were in or on other side of river. Entered plot into database as 23. Flat plot with no aspect, confirmed by Haglöf. Closed mixed broadleaf/needleleaf forest.
July 14	Plot 5	Declared plot inaccessible, took some photos
	Plot 4	Open needleleaf forest with moss, horsetails, and rose
	Plot 3	Open mixed birch spruce forest, standing water in plot. Took 40 min to hike 1 km to camp after this plot.
July 15	Plot 14	Rain today. Standing water, Ledum, and Picmar indicate permafrost but the soil probe went in deeply.
	Plot 19	Nice walking to this plot. Open mixed black and white spruce, good fresh water near plot for filtering and refilling water bottles. Game trail near plot. Stylus on tablet stopped working in the middle of transects, had to resume with paper, and use datasheets for the rest of the day.
July 16	Plot 2	More rain today. Closed white spruce forest, camera lens and hand lenses fogged up, Haglöf stopped working. Spent a lot of time trying to find a way to cross Hult Creek, but the water was too deep. Forced to sample 8 instead.

ACTIVITES, continued:

July 16 (continued)	Plot 8	Standing water, plot in spruce bog. Possibly 40% of plot standing water in pools. High non-vascular plant diversity, including some aquatic mosses.
July 17	Plot 9	This morning crew failed in attempt to raft across Foraker to access plots on opposite shore. Closed Picmar forest, part of plot in flowing stream, standing water in some quadrats.
	Plot 13	Woodland mixed conifer.
July 18	Plot 7	1.5 hours to hike to plot with heavy bush whacking, took pack raft but found a place to wade Hult Creek (knee to thigh.) Woodland black spruce.
	Plot 1	Hot in afternoon, Woodland black spruce. This evening Peter spotted an osprey from camp.
July 19	Plot 16	Found *Pinguicula villosa* and *Drosera rotundifolia* on *Sphagnum* mound. Tamarack/ black spruce forest
	Plot 21	Black spruce
	Plot 22	Inaccessible. Area covered in water due to an elaborate network of beaver dams, difficult hiking in area of plot due to deep standing water at every turn.
July 20	Plot 12	Just above shore of Hult Creek, closed spruce/birch forest. Able to cross Hult Creek at this location.
	Plot 11	Low diversity open spruce. *Drosera rotundifolia* and *Pinguicula villosa*.
	Plot 6	*Drosera angelica* observed in bog between points 11 and 6, woodland black spruce
July 21	Plot 17	Plot located on island amid various channels of freshwater stream. Used down logs to access plot, which was half submerged in Hult Creek and half alder thicket with forest nearby. This plot had interesting ferns.
	Plot 18	Flat forest in vicinity of bogs and streams, open black spruce
	Plot 23	Forest in vicinity of bogs, nice walking back to camp near plots 19 and 14.
July 22	Pack camp, travel	Return to Park HQ by aircraft

Photo 2. Plot 17, partially located in Hult Creek. Photo by Peter Nelson.

Photo 3. Peter locating the center of Plot 22. This area was within a complex network of beaver dams and should be avoided. Photo by Carmen Backes.

Photo 4. Point 18, a typical high lichen / low vascular plant diversity black spruce plot. Photo by Carmen Backes.

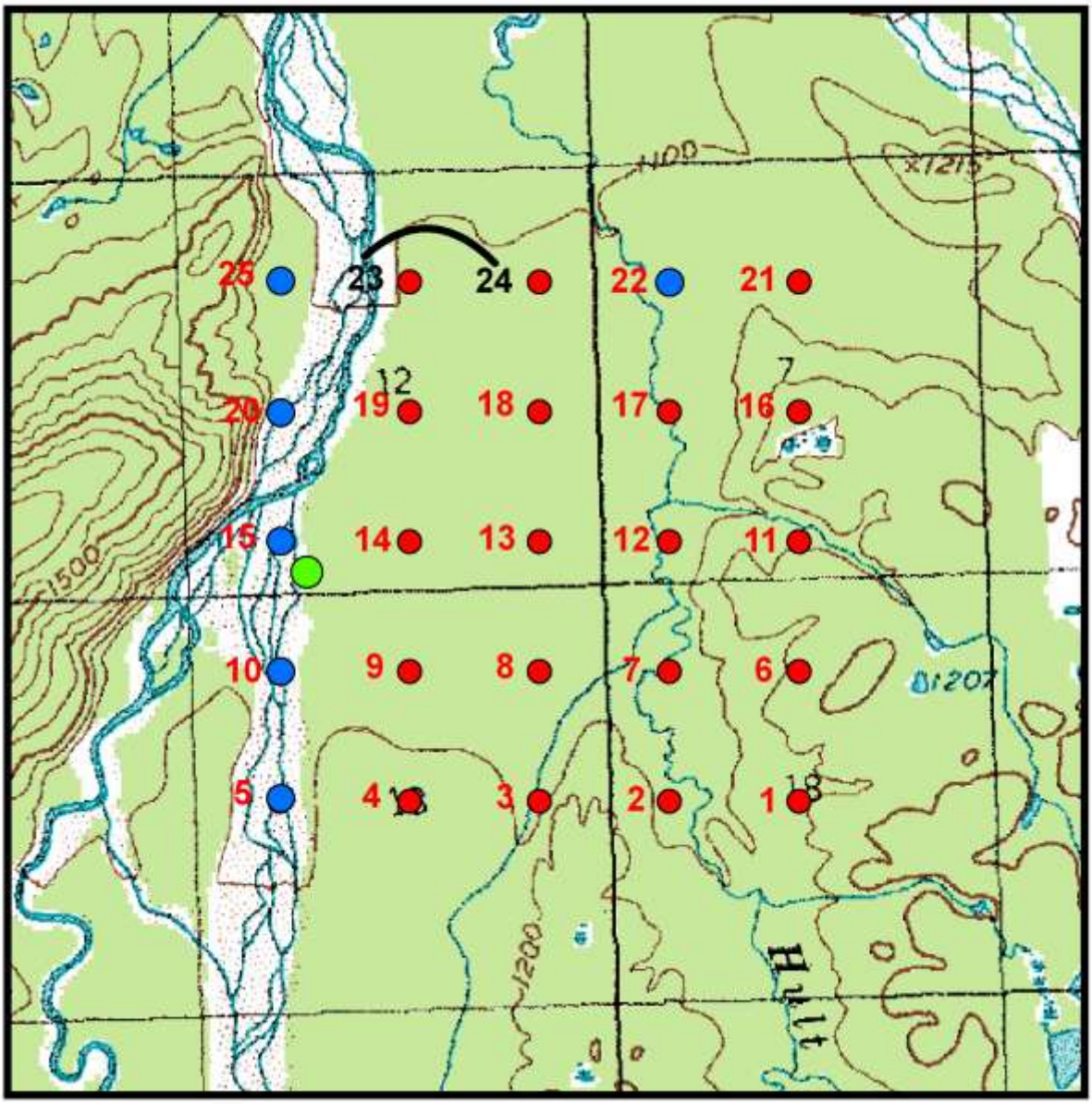
Photo 5. Point 9, with closed forest, brush, and standing water is more typical of the south-central part of the mini-grid. Photo by Carmen Backes.

CONCLUSION AND FUTURE CONSIDERATIONS

The Hult Creek mini-grid is a generally flat, wet, mixed forest representative of this region of Denali National Park. Within this grid we see a convergence of two forest types: tall, mature white spruce and birch with wet, scrawny black spruce and larch. We saw many combinations of these as we hiked throughout the mini-grid. Disturbance and succession played a part in this mix up, as well. Alder was quick to reclaim old riverbeds, and forbs were quick to spring up in openings created by fallen trees. There were a few choice moments for the team to pause and notice the beauty around them--the tea color of Hult Creek flowing past a mat of verdant green moss below a blaze of pink fireweed—before the hum of mosquitoes would bring all back to reality.

Take home messages for future crews:

- Bring plenty of bug-proof clothing. Our team lamented not bringing mosquito-proof gloves to protect hands, and discussed the practicality of a simple piece of bug netting to drape over your head when eating and drinking. These activities are difficult to do on the inside of a bug shirt.
- Bring sturdy rubber or neoprene boots, as well as sandals for the deeper creek crossings.
- Bring a pack raft. As mentioned before, our pack raft was not adequate for crossing the Foraker. However, after two days of rain Hult Creek was too deep to safely wade, especially for shorter people. We were able to wade without difficulty after a few hot dry days, but a pack raft would make the crossing possible even in rainy weather.
- Consider camping on the Foraker gravel bar. It is by far the best place for the helicopter to land, and has other advantages mentioned in this report.
- Bring a small, portable water filter and dromedary bag. Even though there is not much fresh water available at camp, there is just about every other place, it is easy to just to refill water bottles during the day.
- Consider some of the observations listed in the Hiking section, they will make your life easier.
- Remember that 23 and 24 are switched for this plot—for details, refer to the Switched Plots section.



Map 1. Plots of the Hult Creek mini-grid. Red indicates sampled plots; blue indicates inaccessible plots. The green dot is the approximate location of camp. Note the switch of points 23 and 24.

REFERENCES CITED:

Roland, C.A., Oakley, K., Debevec, E. & Loomis, P. (2005) Monitoring vegetation structure and composition at multiple spatial scales in the Central Alaska Network. National Park Service, Central Alaska Network, Final Monitoring Protocol.